

WHAT IS CLAIMED IS:

1. A sprayer head assembly for connection to a container that defines a cavity for storing a chemical to be sprayed; the sprayer head assembly comprising:

a chemical passage configured to be in communication with the cavity;

a carrier fluid passage configured to be in communication with a carrier fluid source;

a housing that has an outer surface and an inner surface, which defines a valve chamber configured to be in communication with the chemical and carrier fluid passages;

a valve moveably positioned within the valve chamber between at least a first position, a second position and a third position, the valve defining a first passage, a second passage and a chemical inlet passage that is in communication with the second passage, the valve being configured such that, in the first position, the valve blocks the chemical and carrier fluid passages, in the second position, the first passage is configured to be in communication with the carrier fluid passage while the valve blocks the chemical fluid passage, and in the third position, the second passage is configured to be in communication with the carrier fluid passage and the chemical inlet passage is configured to be in communication with the chemical passage; and

a single sealing member positioned within a recess on the inner surface, the sealing member defining a sealing portion which extends around a first interface between the carrier fluid passage and the valve and a second interface between the chemical passage and the valve.

2. The sprayer head assembly as in Claim 1, wherein the housing includes a retention structure which is configured to engage a corresponding retention structure on the valve in a snap fit.

3. The sprayer head assembly as in Claim 2, wherein the retention structure comprises an annular ridge on the inner surface and the corresponding retention structure comprises an annular recess on the valve.

4. The sprayer head assembly as in Claim 2, wherein the retention structure is positioned on the outer surface of the housing and the corresponding retention structure is positioned on an outer flange of the valve which extends over a portion of the outer surface.

5. The sprayer head assembly as in Claim 4, wherein the retention structure comprises an annular ridge the outer surface of the housing and the corresponding retention structure comprises an annular ridge on the outer flange.

6. The sprayer head assembly as in Claim 1, wherein the valve rotates about a first axis that is substantially parallel to the carrier fluid passage.

7. The sprayer head assembly as in Claim 6, wherein the chemical passage is substantially perpendicular to the carrier fluid passage.

8. The sprayer head assembly as in Claim 1, further comprising a vent passage that is communication with the valve chamber and the cavity.

9. The sprayer head assembly as in Claim 8, wherein the valve defines a fourth passage which, when the valve is in the third position, is in communication with the vent passage.

10. The sprayer head assembly as in Claim 9, wherein the sealing portion of the sealing member also extends around a third interface between the vent passage and the valve.

11. The sprayer head assembly as in Claim 1, further comprising a screw which extends through the valve to couple the valve to the housing.

12. A sprayer head assembly for connection to a container that defines a cavity for storing a chemical to be sprayed; the sprayer head assembly comprising:

a chemical passage configured to be in communication with the cavity;

a carrier fluid passage configured to be in communication with a carrier fluid source;

a housing that has an outer surface and an inner surface, which defines a valve chamber configured to be in communication with the chemical and carrier fluid passages;

a vent passage is communication with the valve chamber and the cavity; and

a valve moveably positioned within the valve chamber between at least a first position, a second position and a third position, the valve defining a first passage, a

second passage, a chemical inlet passage that is in communication with the second passage, and a fourth passage, the valve being configured such that, in the first position, the valve blocks the chemical and carrier fluid passages, in the second position, the first passage is configured to be in communication with the carrier fluid passage while the valve blocks the chemical fluid passage, and in the third position, the second passage is configured to be in communication with the carrier fluid passage, the chemical inlet passage is configured to be in communication with the chemical passage and the fourth passage is in communication with the vent passage; and

a single sealing member positioned within a recess on the inner surface, the sealing member defining a sealing portion which extends around a first interface between the chemical fluid passage and the valve and a second interface between the vent passage and the valve.

13. The sprayer head assembly as in Claim 12, wherein the housing includes a retention structure which is configured to engage a corresponding retention structure on the valve in a snap fit.

14. The sprayer head assembly as in Claim 13, wherein the retention structure is positioned on the outer surface of the housing and the corresponding retention structure is positioned on an outer flange of the valve which extends over a portion of the outer surface.

15. The sprayer head assembly as in Claim 14, wherein the retention structure comprises an annular ridge on the outer surface of the housing and the corresponding retention structure comprises an annular ridge on the outer flange.

16. The sprayer head assembly as in Claim 12, wherein the valve rotates about a first axis that is substantially parallel to the carrier fluid passage.

17. The sprayer head assembly as in Claim 16, wherein the chemical passage is substantially perpendicular to the carrier fluid passage.

18. The sprayer head assembly as in Claim 12, further comprising a second sealing member positioned in a second recess on the inner surface, the second sealing member defining a sealing portion which extends around a third interface between the carrier fluid passage and the valve.

19. The sprayer head assembly as in Claim 18, wherein the second sealing member is an O-ring.

20. The sprayer head assembly as in Claim 12, further comprising a second sealing member positioned at a distal end of the valve chamber between the valve and the housing.

21. The sprayer head assembly as in Claim 20, wherein the second sealing member comprises an O-ring positioned within a recess formed on the inner surface of the housing.

22. A sprayer head assembly for connection to a container that defines a cavity for storing a chemical to be sprayed; the sprayer head assembly comprising:

- a chemical passage configured to be in communication with the cavity, said chemical passage having an outlet defining a chemical outlet axis;

- a carrier fluid passage configured to be in communication with a carrier fluid source, said carrier fluid passage having an outlet defining a carrier fluid outlet axis;

- a housing comprising an outer surface and an inner surface that defines a valve chamber configured to be in communication with the chemical and carrier fluid passages; and

- a valve moveably positioned within the valve chamber between at least a first position, a second position and a third position, the valve defining a first passage, a second passage and a chemical inlet passage that is in communication with the second passage, the valve being configured such that, in the first position, the valve blocks the chemical and carrier fluid passages, in the second position, the first passage is configured to be in communication with the carrier fluid passage while the valve blocks the chemical fluid passage, and in the third position, the second passage is configured to be in communication with the carrier fluid passage and the chemical inlet passage is configured to be in communication with the chemical passage,

- the valve further configured to rotate about a first axis that is substantially parallel to the carrier fluid outlet axis and substantially perpendicular to the chemical outlet axis.

23. The sprayer head assembly as in Claim 22, wherein the housing includes a retention structure which is configured to engage a corresponding retention structure on the valve in a snap fit.

24. The sprayer head assembly as in Claim 23, wherein the retention structure comprises an annular ridge on the inner surface and the corresponding retention structure comprises an annular recess on the valve.

25. The sprayer head assembly as in Claim 23, wherein the retention structure is positioned on the outer surface of the housing and the corresponding retention structure is positioned on an outer flange of the valve which extends over a portion of the outer surface.

26. The sprayer head assembly as in Claim 25, wherein the retention structure comprises an annular ridge the outer surface of the housing and the corresponding retention structure comprises an annular ridge on the outer flange.

27. The sprayer head assembly as in Claim 22, wherein the valve chamber further comprising at least one recess in which at least one sealing member is positioned, the at least one sealing member defining a sealing portion which extends around a first interface between the carrier fluid passage and the valve and a second interface between the chemical passage and the valve.

28. The sprayer head assembly as in Claim 27, further comprising a vent passage that is communication with the cavity.

29. The sprayer head assembly as in Claim 28, wherein the valve defines a fourth passage which, when the valve is in the first position, is in communication with the vent passage.

30. The sprayer head assembly as in Claim 29, wherein the sealing portion also extends around a third interface between the vent passage and the valve.

31. A method for assembling a sprayer head assembly comprising,

providing a housing defining a valve chamber that is in communication with a chemical passage and a carrier fluid passage, the valve chamber defining at least one recess;

providing a valve configured to fit within the valve chamber and having at least a first passage, a second passage and a chemical inlet passage that is in communication with the second passage,

placing a sealing member into the recess;

inserting the valve into the valve chamber; and

coupling the valve to the housing in a snap fit.

32. The method as in Claim 31, wherein inserting the valve comprises moving the valve along a longitudinal axis of the sprayer head assembly.

33. A method for assembling a sprayer head assembly comprising,

providing a housing defining a valve chamber that is in communication with a chemical passage and a carrier fluid passage, the valve chamber defining at least one recess;

providing a valve configured to fit within the valve chamber and having at least a first passage, a second passage and a chemical inlet passage that is in communication with the second passage,

placing a sealing member into the recess;

inserting the valve into the valve chamber; and

coupling the valve to the housing with a screw.

34. A method of operating a chemical sprayer comprising

rotating a valve about a longitudinal axis such that a first passage of the valve is aligned with a rinsing liquid passage of the chemical sprayer and a second passage of the valve is aligned with a chemical passage of the chemical sprayer;

applying a mixture of the rinsing liquid and chemical to a target surface;

rotating a valve about the longitudinal axis such that a chemical inlet passage of the valve is aligned with the rinsing liquid passage and the valve blocks the chemical passage;

applying the rinsing liquid to the target surface; and

rotating the valve about the longitudinal axis such that the valve blocks the rinsing liquid passage and the chemical passage.

35. A sprayer head assembly for connection to a container that defines a cavity for storing a chemical to be sprayed; the sprayer head assembly comprising:

a chemical passage configured to be in communication with the cavity;

a carrier fluid passage configured to be in communication with a carrier fluid source;

a housing comprising an outer surface and an inner surface that defines a valve chamber configured to be in communication with the chemical and carrier fluid passages; and

a valve moveably positioned within the valve chamber between at least a first position and a second position, the valve defining a first passage and a second passage that is in communication with the first passage, the valve being configured such that, in the first position, the valve blocks the chemical and carrier fluid passages, and in the second position, the first passage is configured to be in communication with the carrier fluid passage and the second passage is configured to be in communication with the chemical passage,

the valve further configured to rotate about a first axis that is parallel to the carrier fluid passage.

36. The sprayer head assembly as in Claim 35, wherein the housing includes a retention structure which is configured to engage a corresponding retention structure on the valve in a snap fit.

37. The sprayer head assembly as in Claim 36, wherein the retention structure comprises an annular ridge on the inner surface and the corresponding retention structure comprises an annular recess on the valve.

38. The sprayer head assembly as in Claim 36, wherein the retention structure is positioned on the outer surface of the housing and the corresponding retention structure is positioned on an outer flange of the valve which extends over a portion of the outer surface.

39. The sprayer head assembly as in Claim 38, wherein the retention structure comprises an annular ridge the outer surface of the housing and the corresponding retention structure comprises an annular ridge on the outer flange.

40. A sprayer head assembly for connection to a container that defines a cavity for storing a chemical to be sprayed; the sprayer head assembly comprising:

a chemical passage configured to be in communication with the cavity;

a carrier fluid passage configured to be in communication with a carrier fluid source;

a valve chamber configured to be in communication with the chemical and carrier fluid passages; and

a valve moveably positioned within the valve chamber between at least a first position, a second position and a third position, the valve defining a first passage, a second passage and a chemical inlet passage that is in communication with the second passage, the valve being configured such that, in the first position, the valve blocks the chemical and carrier fluid passages, in the second position, the first passage is configured to be in communication with the carrier fluid passage while the valve blocks the chemical fluid passage, and in the third position, the second passage is configured to be in communication with the carrier fluid passage and the chemical inlet passage is configured to be in communication with the chemical passage,

wherein the valve rotates about a longitudinal axis and is nested within the valve chamber such that the valve is prevented from moving radially with respect to the longitudinal axis by the valve chamber.

41. The sprayer head assembly as in Claim 40, wherein the valve chamber includes an annular recess and the valve includes an annular ridge configured to engage the annular recess in a snap fit.

42. The sprayer head assembly as in Claim 40, wherein the valve chamber includes an annular ridge and the valve includes an annular recess configured to engage the annular ridge in a snap fit.

43. The sprayer head assembly as in Claim 40, wherein valve includes an annular flange that is configured to engage an annular ridge positioned on the sprayer head assembly.

44. The sprayer head assembly as in Claim 40, comprising a vent passage in communication with the valve bore, said valve including a vent opening configured such that in the third position the vent opening is in communication with the vent passage.



45. The sprayer head assembly as in Claim 40, wherein the valve includes an annular gripping surface positioned on an exterior surface of the valve, said gripping surface extending around the longitudinal axis.

46. The sprayer head assembly as in Claim 40, wherein the valve chamber includes annular flange which includes engagement structures which are configured to engage complementary engagement structures positioned on the sprayer head assembly.

47. The sprayer head assembly as in Claim 40, wherein the engagement structures and complementary engagement structures are configured to engage in a snap fit.